CLAIMS

1.   An encoder, comprising:

a spread spectrum encoder configured to encode data values with one or more spread spectrum codes and generate a corresponding spread spectrum encoded data stream; and

a slip encoder configured to encode other data values into the encoded data stream by varying time spacing between the spread spectrum codes.

2.   The spread spectrum encoder according to claim 1 wherein the slip encoder includes a slip counter that delays the spread spectrum encoder from transmitting spread spectrum codes for a number of clock periods corresponding with associated data values.

3.   The spread spectrum encoder according to claim 2 wherein the slip encoder inserts a slip pattern between adjacent spread spectrum codes while being delayed by the slip counter.

4.   The spread spectrum encoder according to claim 1 wherein the spread spectrum encoder includes a storage device used for storing the one or more spread spectrum codes and a shifter for serially encoding some of the data values with the one or more spread spectrum codes.

5.   The spread spectrum encoder according to 4 wherein the shifter includes:

a multiplexer having inputs for receiving different chips of the spread spectrum codes and an output;

5   a code counter coupled to the multiplexer sequentially selecting different chips of the

spread spectrum codes for outputting from the multiplexer; and

an exclusive-OR circuit combining the outputs from the multiplexer with the data

values.

10   6.   The spread spectrum encoder according to claim 5 wherein the slip encoder

includes a slip counter that delays the code counter from outputting the chips for adjacent

spread spectrum codes according to associated data values.

7.   The spread spectrum encoder according to claim 1 including a data inverter

15   converting a sequence of bits representing selected data values into lesser inverted data

values, the slip encoder varying the spacing between some spread spectrum codes according

to the inverted data values.

8.   The spread spectrum encoder according to claim 7 wherein a header in the

20   encoded data stream identifies the inverted data values.

9.   A spread spectrum correlator, comprising:

a spread spectrum decoder configured to decode data from a spread spectrum encoded

data stream; and

25   a slip decoder configured to decode additional data associated with different time gaps

between codes in the spread spectrum encoded data stream.

10. The spread spectrum correlator according to claim 10 wherein a number of time units associated with the time gaps corresponds with different data values.

11. The spread spectrum correlator according to claim 9 wherein the spread spectrum decoder includes a storage device used for storing one or more reference spread spectrum codes; and

a sampling circuit taking samples of the spread spectrum encoded data stream and comparing the samples with the reference spread spectrum codes.

12. The spread spectrum correlator according to claim 11 including a match counter counting a number of chips for the reference spread spectrum codes that match and mismatch the samples taken by the sampling circuit and identifying data values according to the number of counted matches and mismatches.

13. The spread spectrum correlator according to claim 12 wherein the slip decoder includes a slip counter that identifies an amount of time between the data values identified by the match counter.

14. The spread spectrum correlator according to 13 wherein the slip counter subtracts a transmit time value associated with transmitting the spread spectrum codes from the identified time between data values.

5   15.   The spread spectrum correlator according to claim 9 including a data inverter

identifying inverted data values output from the slip decode and inverting bits for the

identified inverted data values.

16.   A method for encoding data, comprising:

10   encoding a first set of data values into an encoded data stream using spread spectrum

Pseudo Noise (PN) codes; and

encoding a second set of data values into the encoded data stream by varying rates

that the PN codes are output in the encoded data stream.

15   17.   The method according to claim 16 including inserting a number of time

increments between adjacent PN codes corresponding to the second set of data values.

18.   The method according to claim 16 including transmitting and receiving the

encoded data stream using a wireless Universal Serial Bus (USB) device.

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19.   The method according to claim 16 including extracting the first set of data

from the encoded data stream by identifying the PN codes in the encoded data stream and

extracting the second set of data from the encoded data stream by identifying an amount of

time gap between the identified PN codes.

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20.   The method according to claim 19 including:

comparing samples of the encoded data stream with reference PN codes;

5   identifying bits in the first set of data values when a predetermined number of the

samples match or a predetermined number of the samples mismatch the reference PN codes;

identifying an amount of time slip between the identified bits in the first set of data

values; and

identifying bits in the second set of data values according to the amount of identified

10   time slip.